MINUTES OF THE
TRAFFIC SIGNAL TECHNICIAN/TRAFFIC SIGNAL CONTRACTOR CONFERENCE
MCCULLER'S RURITAN CLUB
FEBRUARY 14-15, 2005

MONDAY, FEBRUARY 14, 2005

Introduction:

Greg Fuller welcomed everyone and all attendees introduced themselves. Since the last meeting held in December of 2003, the Traffic Management and Signal Systems Unit name has been changed to ITS (Intelligent Transportation Systems) and Signals Unit. A review of the 2003 meeting minutes was made with no corrections needed.

Metal Pole & Foundation Issues: Presentation by Frank Andrews

In 2002, we began addressing issues to develop new metal pole standards based on problems we were encountering since the original 2000 Metal Pole Standards (developed by Structure Design) were implemented. We solicited information by surveys, and met with all 14 Divisions, pole manufacturers, and signal contractors. As a result, the new 2002 Metal Pole Standards incorporated the following:

- Fewer foundation choices. (2000 standards had 4 different diameters; 2002 standards have only 2).
- Mast arm lengths expanded from 50' up to 75'.
- Load cases were expanded.
- Some interchangeability.

What we have learned in the last year

During this time of development, the new 4th Edition AASHTO was adopted, which was incorporated into these standards. Strain pole standards went into effect in March 2003. Mast arm standards went into effect in June 2003.

In the December 2003 Signal Technician & Contractors Conference, we presented the new standards. At that time, very few if any of the new 2002 standard poles had been installed. Today the new standard poles are being installed throughout the state. Many issues have come up since these standards began being installed.

Presentation Focus

Issues that have been addressed this year

- Metal Pole issues (structure design and review)
- Foundation issues
- Construction and installation issues
- Changes this year

There have been many metal pole issues this year. Through teamwork and good communications, many of these issues have been addressed or resolved. Thanks to all who have helped identify problems and worked together to resolve them.

Some issues have not been resolved. A Metal Pole Work Group has been established to address these issues. They will also be looking at standardizing construction processes between traffic signal, signing, and lighting supports.

Metal Pole Issues

Structure Design

Issue: *Number of anchor rods*
Action: Added note to loading diagrams that specifies the number of anchor rods.

Issue: *New Metal Pole Standards are over designed and may not be cost effective*
Action: Immediate elimination of 3% vertical deflection criteria for all mast arm structures. New AASHTO code adequately addresses this without the need for this criterion. Elimination of this criterion should result in a significant reduction of the pole diameter for long mast arm structures.

Action: Temporary suspension of use of the metal pole mast arm standards. All plans with metal mast arm poles will be custom designed until further notice. Shannon Sweitzer said projects/poles under construction could be modified on a case by case basis. Price negotiations due to redesign or steel price increases will be handled by Divisions. Contact the Prime/Resident Engineer for project specific details.

Action: Major update to metal pole standards in 2005.

Structure Design Review

Issue: *Tracking and processing time sensitive submittals*
Action: Implemented internal procedures for tracking the receipt, review, and transmittal of catalog cut and structural document submittals.
Contractors were advised to follow the proper protocol for submittals. Submit through Prime Contractor to Resident Engineer, then to us. Do not bypass either without their knowledge or permission.

Action: Developing MathCAD programs to help streamline structure analysis reviews.

Issue: *Difficulty trying to determine correct specification to use for shop drawing review of Division purchase order and Developer projects.*
Action: All projects with metal signal supports are now being transmitted with metal pole provisions. This is not a problem for TIP projects.

Foundation Issues

Standard vs. Custom Design

Issue: *Drill pier lengths from Standard Foundation Selection Table are too deep.*
Action: Drilled pier special provisions revised to allow Contractor to submit his own foundation design.

Issue: *Wing Walls*
Action: Number of cases reduced from 228 to 34 in April 2004. We know that most Contractors have 54" augers. On February 3rd, 2005, 18 additional cases were eliminated if 54" diameter shafts are used.

Concrete

Issue: *Type A (3000 psi) vs. Type AA (4500 psi).*
Special provisions allow Contractor to submit own design mix.
Action: 2.14 Special Provisions revised to allow Contractor who uses AA Drilled Pier mix to install structure when concrete reaches 3000 psi strength.

Installations in New Construction Fill Areas (Collapsing Soils)

Regional Operational Soils Engineers are available to assist when foundation construction issues arise in the field.

Eastern Regional Operations Engineer (Divisions 1-7):	Chris Kreider, PE 919-662-4710
Western Regional Operations Engineer (Divisions 8-14):	John Pilipchuk, PE 704-455-8902

3 types of casings are used to help supports drill shaft walls in unstable soil: corrugated, one piece, and telescoping.

Issues regarding collapsing soils are potential issues for the Metal Pole Work Group.

Installations in Unsuitable Material

Issues regarding this are potential issues for the Metal Pole Work Group.

Construction & Installation Issues

Issue: *Anchor nut tightening procedure.*
Written procedure provided to everyone in attendance. Procedure was implemented September 1, 2004, by the Chief Engineer and the Director of Construction. Procedure requires a 600-ft/lb. torque on all structure base anchor bolts and leveling nuts. Procedure is effective now and directs procedure to be used on all current and future projects. There are some issues regarding this procedure that will be addressed in the Metal Pole Work Group. Divisions are directed to use discretion in implementing these procedures.

Issue: *Use of Direct Tension Indicators (DTIs)*
DTIs are not to be used on pole base plate connections. Arm-to-pole connections are considered high strength connections. Both our Structure Design Section and Bridge Construction Engineers recommend DTIs on these connections. Loading diagrams for custom design poles now require DTIs on the arm connections.

Issue: *Anchor Bolt Orientation*
2002 Metal Pole Standards specify a welded arm-to-pole connection unlike the 2000 standards that provided for a clamp-on type connection which allowed the mast arm to be swiveled to obtain proper arm positioning. The welded arm connections do not allow this, so when foundations are poured it is important to ensure that anchor bolts are properly oriented. Base plate templates are provided with each pole that identifies the centerline of the mast arm that should help with this issue.

Issue: *Roadway Clearance Problems*
Pictures of some problems with roadway clearance were presented. Issues this year have been related to over height conditions. Some problems are due to incorrect selection of standard poles or improper survey data. Other problems are related to Contractors moving poles and not checking clearances.

Potential Changes This Year
- Major update of Metal Pole Standards (Mast Arms and Strain Poles)
- Standard Specification Update – Ready for January 2006 Letting
- Roadway Standard Drawings
- Special Provisions
- Custom Design all Metal Signal Supports

Summary
1) Measure progress in small steps.
2) We will continue to work the design and constructability issues with the other DOT groups, Contractors, and metal pole fabricators.
3) Innovation and creativity are encouraged in custom designs.
4) Maintain good communications.
5) Costs roughly $77,000 per intersection to install metal poles. Costs roughly $18,000 per intersection to install wood poles (8-pole arrangement). Wood poles last 15 years. Metal poles being designed by Structure Design could last 50 years. Divisions need to provide realistic data on the life cycle of wood poles versus metal poles for a 10-year period.
6) A limited number of Divisions are stocking metal poles. Consistent anchor bolt pattern. Costs must be reduced. Fabricators must follow chain of command (Resident, Prime Contractor, etc.). Follow the process/procedure. Inexperienced Resident Engineers need to be made aware of unsuitable fill material. Get involved in Preconstruction Conferences so issue shows in the minutes.

Questions/Remarks
Earl Driggers asked why poles are smaller in SC. Frank Andrews answered that wind loads in NC are slightly higher. Custom designed poles are a preference. We need to be more consistent on the concrete mix (3000 psi versus 4500 psi). There is a difference in "drilled pier concrete" versus AA concrete (Slump difference, see Page 10-5 of Standard Specs.). Be aware that custom poles require more review time.

Kenny Fulcher said that time for reviews is not an issue. Soil tests take more time and have slowed process more than manufacturing of poles. Need to speed up the process so we may request NCDOT Geotechnical Unit perform soil tests as needed.

Scott Colter advised that when we use metal poles for temporary signals we are still having problems with grades from Contractors.

Kenny Fulcher recommended we go back to "clamp-on" arms to help with height problems. He thinks we have too much deviation in grades and too many height and angle on poles. He feels that 35-ft. steel strain poles are often overkill.

Marty Headen advised that Duke Power tightens and torques anchor bolts on Duke Power poles with signal heads on the span.

John Jenkins asked about arm connections on Mast arms. Greg and Frank advised that you need 1 ½" direct tension indicators on mast arms with 600 ft. lbs. on base. Currently we are only aware of one fabricator of 2" direct tension indicators.

Lacy Love, NCDOT Director of Asset Management, and Delbert Roddenberry, Assistant Director, joined us for the afternoon session of the Conference.

NESC Requirements for Cable Attachments on Joint Use Poles: Presentation by Neil Avery
NESC Manual – Neil's handout gave examples of joint use poles with signals and NCDOT signal poles with no joint use. Tim Robeson of Progress Energy will be taking this drawing to several committees. Clyde Mauney said that in his Division, Southern Bell wants to be on the bottom. Due to potential for signal heads to come in contact with other cables at lower attachment points, NCDOT would prefer to be on the bottom wherever possible when attaching messenger cable for signal heads. Please note that this is only a preference and is not a standard at this time. Our spans are considered effectively grounded due to our bonding requirements. Attachment of signal head messenger cable is typically 24' above grade.

Oasis and TransLink 32 Update: Presentation by Milton Dean
Oasis Update - Version 3.00.92 is the latest version and a handout was received for version update requirements. All intersections operating with OASIS/OSM version 3.00.59 or below should be immediately updated to version 3.00.92. OASIS/OSM version 3.00.92 will be required in closed loop signal systems to interface with Translink32. The 3.00.81 version software in isolated intersections should be updated during the normal preventive maintenance. All repairs at the Traffic Electronics Center will be upgraded to latest approved version. Milton

thanked Mark Harrison, Steven Click, Ted Faulkner, and Belayneh Mekuria for their testing and evaluation of all software. Any suspected software bug issues should be sent to Mark Harrison.

TransLink 32 Update – Met with Econolite in December 2004 for 4 days. August 2002 was original deadline and we are 2 ½ years late at this time. An updated CD is expected in next few days. We are optimistic, but cautious. Once the version is ready for release, a CD and manual will be made available. Software is for use on NCDOT projects only!!! Training will be provided. It will work with Oasis/OSM Version 92 and above.

Milton Dean's Handout included modem requirements. U.S. Robotics V.92 is required. A firmware update for U.S. Robotics V.90 modems is available online.

Programming Issues for Oasis/OSM: Presentation by Mark Harrison
Certain 2070L hardware failures can cause configuration data to be lost. This becomes particularly critical at railroad preemption locations. Make default configuration the same as the current configuration. Be sure to backup database during annual railroad preemption inspections and whenever any timing change is made at the intersection. See handout given.

PROCOMM PLUS Software: Presentation by Steven Click
PROCOMM PLUS replaces "HYPERTERMINAL". It is now an automated process with average down time to upgrade software reduced to 3 ½ minutes versus 13 minutes. Be sure you get the script from NCDOT, TEB. There are other versions out there that can wipe out controller programming. Law enforcement appreciates this time improvement. Only 3 Divisions out of 14 have PROCOMM PLUS. Terry Spell has purchased. Greg passed out copy of e-mail that had been sent to Steven Hulsey that showed approval to purchase for all Divisions had been made on December 23, 2004. The other 11 Divisions need to contact their Computer Consultant and have them check on the status of the software. Greg advised that computer consultant personnel were very valuable and to develop a good working relationship with them.

Ground Fault Circuit Interruption Protection for 2070L Controllers and LED Issues:
Presentation by Milton Dean
Eagle does not ground its chassis. Others do ground, but a short circuit to ground can burn the trace open. GFCI is now required during bench testing at a cost of roughly $30 each and should be tested monthly.

There are problems with Cooper Green LED Balls (2002-2004). The LED's blink or flicker. Dialight 430 Series is going out of warranty. Presently have no published criteria for replacing LED's. NCDOT is testing 20 LED modules (all three colors; 12" balls and arrows) to determine degradation over 2-½ year period. General guidelines for replacement schedule to be developed in about 1-½ years.

John Walden demonstrated how DIALIGHT LED's flicker when first turned on to indicate end of useful life. Industry is developing various techniques for user notification of failing LED modules.

Twelve out of fourteen Divisions are on schedule to have changed to LED's by July 2005. Divisions 2 and 12 will not have all LED's installed by July 2005.

Power bills have dropped by 50%. Duke Power wants to go with a fixed rate which will require approval of Utilities Commission. It is to our advantage to put in meters. Greg and Milton are still waiting for response from Department of Insurance regarding inspection issues. If problems are encountered getting power turned on at any traffic signal, let Greg know.

Wireless Communications: Presentation by Neil Avery
Handout was given with presentation. Division 9 is the first in the State to use it so far. Has been added to Project Special Provisions. No FCC license is required and can operate as a repeater. Installation is quick and simple with range up to 20 miles. Cheaper to install than fiber in some instances. Field proven in several states. Disadvantages are blackout during severe weather and changes in environment with new building construction. Can be used in downtown areas, crossing railroad tracks, and where utility conflicts are found. There are locations where site surveys have been conducted (Divisions 3, 8, 9, 12, 13, and 14). The Thomasville System in Division 9 is operational.

R-4701 Maintenance Funds: Discussion by Lacy Love
Continue to use the R-4701 Maintenance money. It is there to ensure that signals are in good working order. Started with $5.5 million state maintenance funds and now have $18 million. New road construction is winding down. Must manage signals and congestion in the future more efficiently.

New Equipment and Qualified Products List: Presentation by John Walden
Electrical disconnect with meter base is not on Qualified Products List yet. John is currently reviewing this. Depth of burial is an issue. Pelco has recalled u-bolts for astro-brackets that were manufactured between February 23-July 29, 2004. Copy of Pelco memo was distributed.

Project Special Provisions & Standard Drawing Revisions: Presentation by Pam Alexander
Handouts were distributed outlining additions and revisions to the Project Special Provisions since last meeting. It is the goal of NCDOT to implement revised Standard Specifications and Standard Drawings by the January 2006 letting. Additions are Wireless Radios, Self-Healing Ring Transceivers, and HDPE conduit. Metric values will not be included. Requirements are being added to submit "Inductive Detection Loop & Grounding Results" form. Adding 1-section LED pedestrian heads with countdown (Department's new standard pedestrian head). Drawings related to the removed sections will not be included in the Standard Book; they will be posted on Unit's website. The majority of attendees wish to have all specifications in Project Special Provisions.

Resident Engineer's Training Course for Signal Inspectors is upcoming. The course will be conducted by ITRE and taught by Benny Johnson, former NCDOT employee. Goal is to have the first course in July 2005.

OPEN DISCUSSION

On metal pole foundations the specification requires pvc conduit.

Only 2-3 Contractors have actually installed wing walls in North Carolina.

Frank Andrews – If "N" value is less than 4, then you must get special foundation design, and DOT will bear the cost.

Union Metal mast arm poles are no longer on the QPL. We are redesigning standard mast arm poles.

Scott Colter questioned the requirement to dig and pour concrete in the same day and asked if this could be changed? Per Shannon Sweitzer, if you leave the casing in place, then it is probably OK. Common sense needs to be used. We will consider the specification be rewritten to say 24 or 48 hours.

Strain Relief – Milton Dean to address. Is it needed? Have we had any problems? Do you have to pull your loop lead-in through it too? 30' pole with 20' footing in the ground. Use a rubber grommet. How many statewide? 2 or 3 – Greg will revisit this issue.
After further consideration, since there has been no evidence of problems in the past where strain relief was not used, the requirement for strain relief in metal poles will be removed in future projects.

After the meeting, Pam Alexander was asked by Scott Colter about using 4" conduit instead of 2" conduit when he had to mount 2 signs and 2 push buttons. Rather than use 4" conduit, we will modify the Standard Drawing to show the signs and push buttons staggered (4" conduit would be a safety hazard).

TUESDAY, FEBRUARY 15, 2005

Introduction Address: Kevin Lacy, State Traffic Engineer
Kevin started off the second day by saying that 99% of the time, signals are working right. Kevin recognized the Technicians and thanked the Technicians for their work.

Career Banding for Electronic Technician Classification: Presentation by Angie Fanelli and Amanda Olive
Angie gave a short history of Career Banding. Bands are much broader and based on labor market. Eventually, every State employee will be career banded. Office of State Personnel will be studying the "Trades" and "Office Support" personnel next. The Electronic Technician classifications are included in the "Trades" group. Ability to increase your salary by obtaining skills or competencies.

Amanda Olive – Primary Personnel Analyst for the Divisions (works with Angie) – Career banding will allow for more flexibility. The program will provide for compensation based on the employee obtaining measurable competencies in job-related skills. Old pay grade range with minimum, midpoint, and maximum will go away. New pay rate will be based on labor market and what your job worth actually is. The program will be ongoing and the employee's skill block information will be tracked in a database.

Greg questioned the Divisions concerning having an ELT III in a Signal Technician position. Division 2 was the only Division that indicated not having an ELT III position.

NC One-Call Center: Presentation by Jim Tyler
Division 3 started 6 years ago by implementing database to track calls (tickets) and fiber locations. They have the ability to know (in database) whether underground facilities are present, without making a trip to the locations. This saves time and money. Jim indicated "gridlets" break his locations down into smaller, more manageable areas. If a location falls outside a gridlet, the Division knows they do not need to spend resources verifying NCDOT facilities. Jim stated the Division's traffic signal loop damages have significantly decreased since they became a member of NC One-Call. Greg stated this is another way to be proactive in our traffic signal maintenance.

Railroad Preemption Signal Inspections: Presentation by Rob Ziemba
Recent fatality is a reminder of the importance of doing inspections annually. Copies of inspection forms are to be sent to Signals & Geometrics Engineer Richard Mullinax. Divisions could contract out this work if needed. New inspection form is being developed. Send comments to Rob Ziemba. "Exit Gates" are to be added to this form. They will add 10-12 seconds to clearance time.

Four-Section Left Turn Signal Display: Presentation by Steven Click
Handout was presented to all attendees. About 30% of US intersections include Protected - Permitted Left Turn phasing. NCDOT is to install a four-section flashing yellow arrow display soon on New Bern Avenue at Wake Medical Center (this was turned on February 22, 2005). Charlotte currently has one site working. We will monitor location and accident data to determine the display's effectiveness.

Dynamic Message Signs (DMS) and CCTV Grounding Procedures: Presentation by Tom Parker
DMS and CCTV grounding requirements have been modified. The 3" wide copper strap has been changed to a 1 ½" braided copper strap. This change was incorporated because the 3" strap was not strong enough to withstand wind loads and was tearing off of the poles. Be sure to use air terminals on top of the CCTV poles. Some Contractors have tried to use ground rods for the air terminals but this is NOT acceptable.

There is a new grounding detail for DMS. All DMS structures should be grounded. These structures should be bonded to the grounding system for the service disconnect.

NCDOT/Contractor Conference: Presentation by Greg Fuller
Greg had recently attended the Conference. The theme was "Working Together to Meet Expectations". Listed below are some of the key points from the Conference.

1) Build faster, build better, and build within budget.
2) Communication and trust. Everyone must communicate to have successful project. Greg stated there are many years of experience in our Conference that need to be shared with the new Assistant Residents and Resident Engineers. By working together, we can meet the expectations.
3) Punch list issues: Contractors should complete their own punch list prior to requesting an inspection from NCDOT. The Resident Engineer is responsible for developing the final punch list provided to the Contractor. Greg advised that Traffic Signal Technicians must develop punch list based on the Project Special Provisions and not personal preferences. They should make it easy for the Resident Engineers and not create extra work for them.
4) Monthly estimates: Quantities should be reconciled daily/weekly/monthly. Sub-contractors should discuss discrepancies with the Prime.
5) Extra work. Contractor should provide thorough breakdown and justification for prices. This will expedite the Resident Engineer's review. Collectively, look for ways to reduce risk.
6) Receiving Submittals: Greg stressed using the Qualified Products List. If you need a quick review, indicate this when you submit the catalog cuts. Every project can not be an emergency, but we will expedite our review wherever possible. Steve Dewitt suggested a dual submittal process be used.
7) Management of Sub-Contractors. NCDOT will not manage the Prime's Sub-Contractors. Sub-Contractor should hold on-site meetings and keep Prime informed. Resident Engineer will notify Prime if there are issues with a Sub-Contractor.

OPEN DISCUSSION

Signal Contractors expressed concern over not being notified about Preconstruction Conference on roadway projects. Steve DeWitt will ask the Resident Engineers to include Signal Contractors in these meetings. This is an opportunity to discuss metal pole constructability issues such as fill material and grades. Steve will also ask the Resident Engineer to notify the Traffic Signal Technician Supervisors and keep them informed throughout the project.

Maintenance and Repair of Traffic Signals

The NCDOT began using a provision with the September 2003 lettings that allows for a $250/day liquidated damages when a Contractor failed to respond in accordance with the specifications. The Traffic Signal Technicians indicated this is not working and many Contractors are not maintaining the traffic signals as required by the Project Special Provisions.

We are proposing to revise this provision to require a $2500/day, or any portion thereof, liquidated damages and all expenses incurred by the Department to make the repairs for a Contractor. **If you have any comments, please respond to Greg by April 15, 2005.**

Lighting for Overhead Signs

There were concerns expressed about lighting for overhead signs. This issue was presented to State Traffic Engineer Kevin Lacy after the Conference. Kevin advised that we are currently looking at two alternatives to the traditional method of overhead sign lighting. The first involves the use of solar panels. This alternative will be used on the Knightdale Bypass Project. The second alternative involves the use of a high intensity sheeting that does not require lighting. There is a test site scheduled for this alternative in Division 10.

Traffic Signal Inspection Checklist

The ITS and Signals Unit will develop a traffic signal inspection checklist to be used statewide. This will be provided to the Construction Unit to ensure consistent inspections across all projects. **If you have any comments, or would like to assist with this checklist, please notify Greg by April 15, 2005.**

There was a concern that using number 8 AWG copper wire on a fifty-amp breaker violates NEC codebook. A statement was made that a number 8 wire has a rating of 50 amps at 75 degrees C or a rating of 55 amps at 90 degrees C and a rating of only 40 amps at 60 degrees C. We have discussed this concern with the Department of Insurance and determined there are no code issues with our existing service design. The connections are UL rated for 75 degrees C and therefore we can use the amp rating of 75 degrees for the service conductors.

R-4701 Signal Preventive Maintenance and Emergency Maintenance: Presentation by Greg Fuller

Greg talked about FY 2004 Annual Report showing each Division and number of PM's performed and not performed during the year. The money is there in R-4701 to get traffic signal maintenance done, but not to be used for sign lighting. Half of the Contractors present would like to do the PM's for the Divisions. Of 8800 signals statewide, approximately 4400 PM's have been completed. Retiming results are much worse! Statewide, the greatest concern from public is permanent calls from traffic signal loops not working. This creates unnecessary delay, congestion, and causes accidents!

Mentor/Protégé Program: Presentation by Roberto Canales, State Contractual Services Engineer

Purpose of pilot program is to create more diverse Contractual pool of Prime Contractors and Sub-Contractors with DOT. The 14 Divisions and their staff are actively involved in the Program. It encourages DBE/MBE/Small Business. It also increases communication between Prime and Sub-Contractors. Anyone interested in other information can contact Odessa McGlown at 919-733-7174 or visit the website at www.ncdot.org/business/ocs/programs.

Closing Comments: Greg Fuller

Greg recognized all the presenters and planners of the conference and thanked them for a job well done. Any questions or issues regarding the minutes can be addressed to Greg Fuller or Larry Young.

The Conference was well attended both on Monday and Tuesday. We had approximately 90 people on Monday and 85 people on Tuesday, with 32 Division Personnel and 34 Traffic Signal Contractors in attendance each day.

Respectfully submitted,

Peggy J. Barnhill
Mike Braswell
Jason Hooker
Ken Peedin
Tim Williams
Larry Young